System Architect

FSA-EAF

Business Function

Introduction

The functional focus provides details concerning the processes and procedures performed by humans. The rows in the function column describe the process of translating the mission of the enterprise into successively more detailed definitions of its operations.

Row one is a list of the business lines the enterprise conducts. Rows two and three describes these activities in a context and operations diagrams. The functions are broken down into processes, described exclusively in terms of the conversion of input data into output data. In the system row, it describes the business systems used to complete the business functions. The technology model in row four then converts these data conversion processes into the definition of program modules and how they interact with each other. Pseudo-code is produced here. Row five then converts these into source and object code. Below row five the code is linked and converted to executable programs.

The following diagrams and definitions represent the products that collectively make up this view:

Row 1 - Scope (Planner Perspective)

- Lines of Business
- Business Functions
- Business Processes
- Key Business Activities

Row 2 – Enterprise Model (Owner Perspective)

- Business Context Diagram
- Operational Concept Diagram
- Business Process Diagram
- Business Function Hierarchy Diagram
- Related Matrices

All diagrams and definitions in this view can be accessed through the Framework Browser. To access the various diagrams and definitions the user should navigate to the Business Function column, and select the desired perspective.

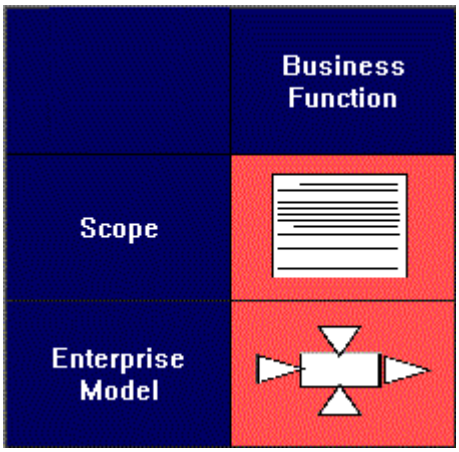


Figure 1 Business Function Focus of the FSA-EAF Framework

Navigate to the Framework Browser and explore the Business Function Focus of the FSA-EAF Framework.

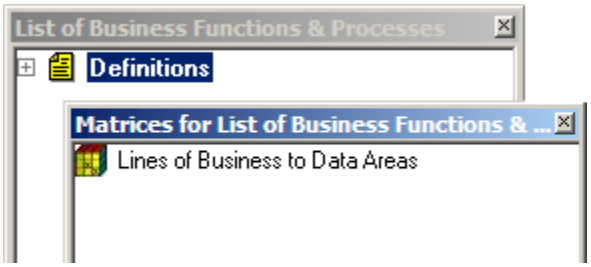


Figure 2 Business Function Browsers

- Open the Browser at the **Scope / Business Function** intersection. Expand the Definitions list to view the **Core Business Functions** added to the repository earlier in the course.

- *Remember that Core Business Functions implement Objectives from the Strategy column.*

- Right-click on a Core Business Function in the Browser and select **Referenced By…**

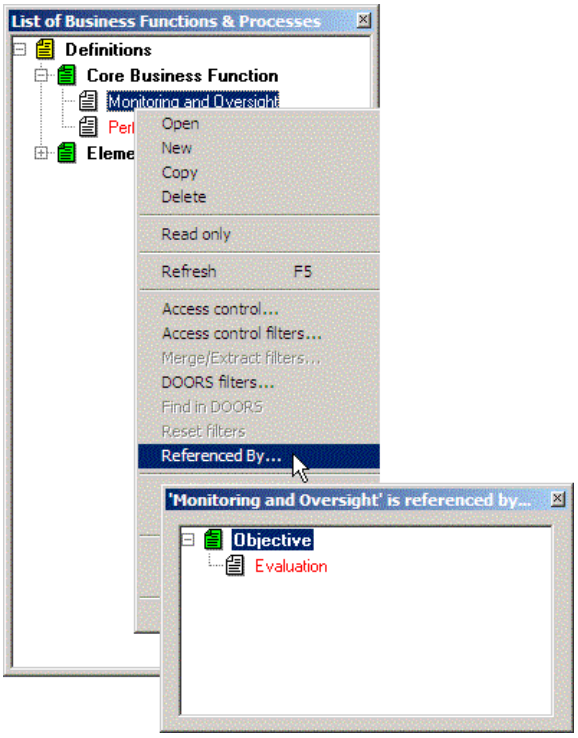


Figure 3 Referenced By...

Elementary Business Process

The **EBP** definition includes the following information:

- **Name:** The standard naming convention used.
- **Short Description**: This is used to capture some detail about the process and where it fits into the hierarchy of processes.
- **Related System Functions**: These are the System Functions that are associated with the EBP. System Functions are seen on System Function Decomposition and System Functionality Diagrams. These diagrams exist in row 3 of the Business Function column, Designer Perspective.
- **Physical Node**: Allows an association to a single Physical Node. Physical Nodes are modelled and defined in greater detail on the **System Interface Diagram** seen in the **Network** column.

- **Related Requirements**: This Grid style interface allows users to associate all the relevant requirements that may be related to any given Elementary Business Process. A matrix has been provided to relate requirements to EBPs. It is located under the Tools Menu, FSA Matrices, **"Elementary Business Process to Requirement"**.

- **Security**: This tab allows the user to relate the Elementary Business Process definition to all Security Policies that impact upon that EBP.

☞ *Note that Related System Functions and Physical Nodes are out of scope for this course.*

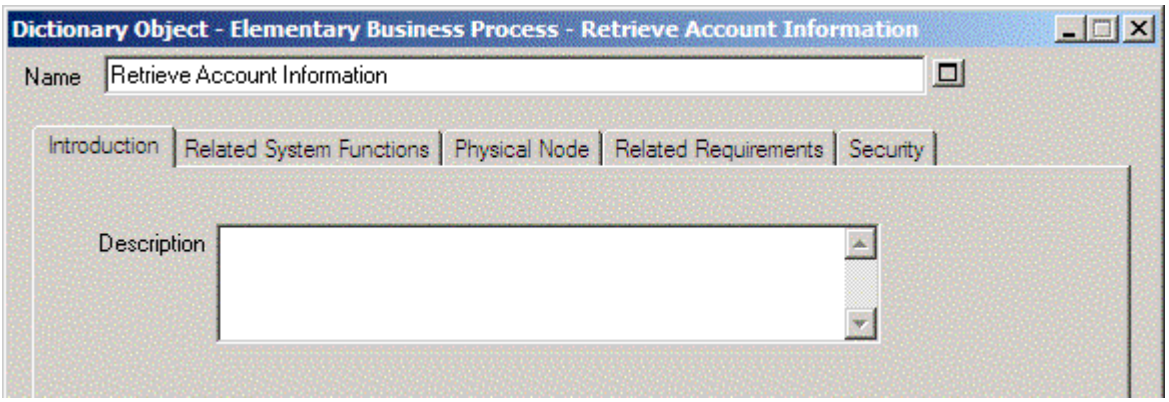


Figure 4 Elementary Business Process definition dialog

✋ Create two new **Elementary Business Process** definitions via the Browser, named **Process Application**, and, **Notify GA of Lender Eligibility**.

☞ *Hint – Right-click on the existing label Elementary Business process and select **New**. Because you have implied the definition "Type" you are simply asked to provide the new name, rather than having to select Elementary Business Process from a list of all definition types.*

The EBPs are the low level "building blocks" of the organization and support, through a parent child diagram relationship, the Key Business Activities on the Functional Hierarchy diagram, coming up later in this chapter.

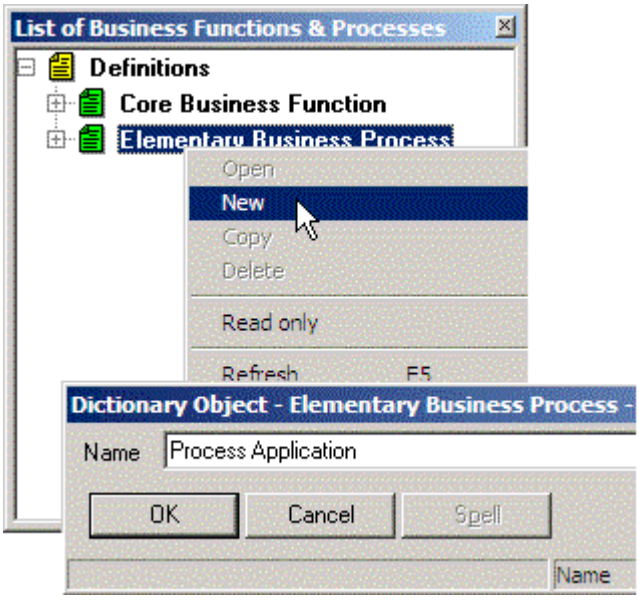


Figure 5 New Elementary Business Process

Business Context Diagram

The Business Context diagram describes FSA's business interactions with entities (Nodes) external to FSA (high-level organizations, missions, geographic configuration, connectivity, etc) through the needlines between them, and the characteristics of the information exchanged. The diagram is used as a high-level identifier for e-government opportunities and as a basis for identifying key interactions with external stakeholders (e.g., other federal agencies.). Each needline is represented by an arrow (indicating the direction of information flow), which is annotated to describe the characteristics of the data or information. Examples of characteristics include its substantive content, media (voice, imagery, text and message format, etc.); frequency of transmission; security or classification level; priority; and requirements for information system interoperability. Information-exchange characteristics are shown selectively, or in summarized form through the grid option.

It is important to note that the arrows on the diagram represent *needlines* only. Each arrow indicates that there is a need for some kind of information transfer between the two connected nodes. There is a one-to-many relationship between needlines and information exchanges; that is, a single needline arrow on the diagram is a rollup of multiple individual information exchanges.

The System Architect diagram type used to construct a Business Context diagram is the **Node Connectivity**. Upon the creation and naming of a new Node Connectivity diagram the user is asked to specify the nature of the diagram, **Business Context** or **Communications Map**. The latter choice pertains to a diagram type used elsewhere in the Framework.

☞ *Once the Diagram Type been designated it becomes **Read-Only** meaning it is not possible to change the nature of an existing Node Connectivity diagram.*

- Click the cell at the **Enterprise Model / Business Function** intersection of the Framework.
- Elect to create a new diagram of type **Node Connectivity**. Name the diagram **FSA Relationships**. Designate the **Diagram Type** as **Business Context** (the default option) and click OK.

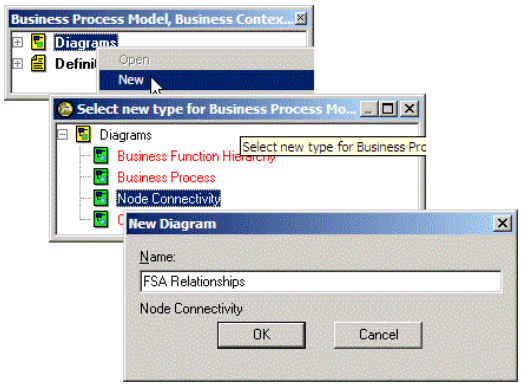


Figure 6 New Node Connectivity Diagram

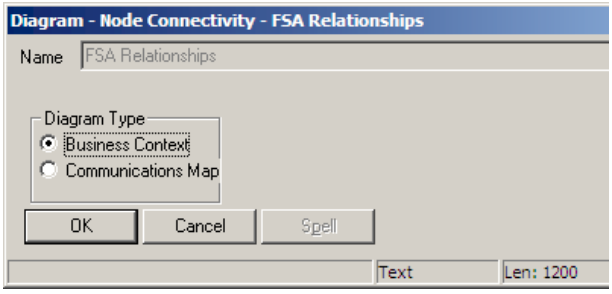


Figure 7 Designated as Business Context

- Select **Logical Node** as the symbol type to draw, either from the Draw Toolbar or the Draw menu.

- Place six Logical Node symbols on the diagram and set their definition **Type** property as follows:

Logical Node Name	Type
• **FSA**	Organization
• **Dept of Education**	Organization
• **School**	External
• **Student**	External
• **Financial Partner**	External
• **President**	Other

- Resize the symbols if necessary.

- Complete the diagram by connecting the Logical Node symbols with Needlines. Experiment with different Line Styles.

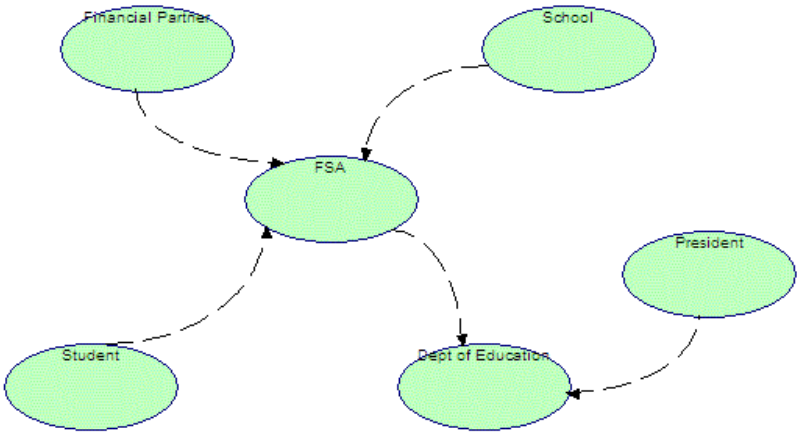


Figure 8 Example Business Context Diagram

- *Note that upon returning to the browser the name of the diagram is suffixed with the **<Diagram Type>**.*

- *This is very important in distinguishing between Business Context and Communications Map diagram types as they are both built with the Node Connectivity diagram.*

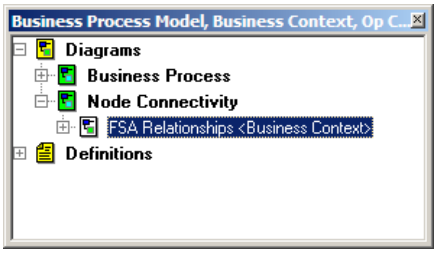


Figure 9 Diagram Type suffix

Operational Concept Diagram

The Operational Concept diagram is a high level graphic that shows the operation of FSA. This is a one-page diagram that shows senior managers the business vision and the operation at a high level; it also shows technology managers how technology can support that business-operation vision. The main purpose is to facilitate discussions and is an important presentation graphic for high-level decision makers.

Diagram Symbols

There are a number of different symbols associated with the Operational Concept diagram that represent various states or instances of FSA systems, Non-FSA Systems and Interface mechanisms.

- Create a new **Operational Concept Diagram** named **Partial TSV Application Architecture**.
- Take a moment to browse the various symbols available on the Draw toolbar (or Draw menu).

Conceptual Information Exchange

Conceptual Association

Figure 10 Line Symbols

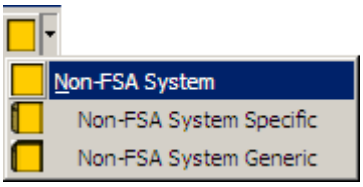


Figure 11 Non-FSA Systems

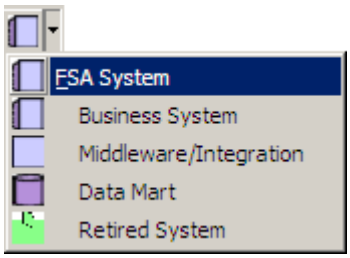


Figure 12 FSA Systems

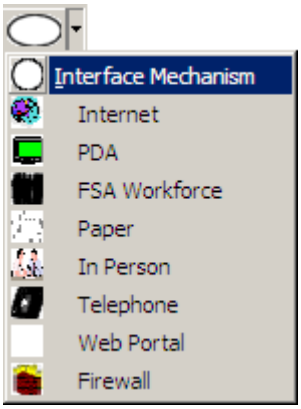


Figure 13 Interface Mechanisms

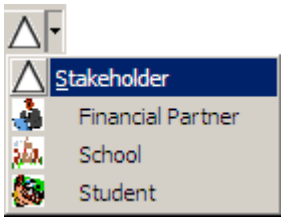


Figure 14 Stakeholders

Figure 15 Web Service Symbol

Each of the drop down lists has a default symbol at the top. You may elect to draw the default shape, then at a later date modify the style of the symbol to represent a more specific state. This is achieved through a property on the definition of each symbol, often referred to as the symbols “stereotype”.

Alternatively the user may point directly to a symbol type on the drop down list and place it directly on the diagram. Through the symbols floating menu you can then elect to display the symbol as its type, or as the default representation.

We will experiment with both approaches during this part of the course.

- Place four **Non-FSA System** symbols onto the diagram, using the default symbol notation you see on the Draw toolbar (ie **do not** use the drop down list).
- Name the Non-FSA System symbols, **Financial Partner Systems**, **ELM Net & Meteor**, **National Student Clearing House** and **School Systems** respectively.

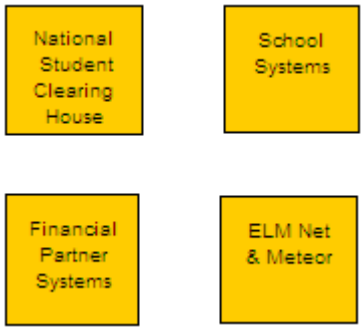


Figure 16 Non-FSA System Symbols

- Edit the definition for the symbol named Financial Partner Systems, set the **Type** property to **Non-FSA System Generic**.

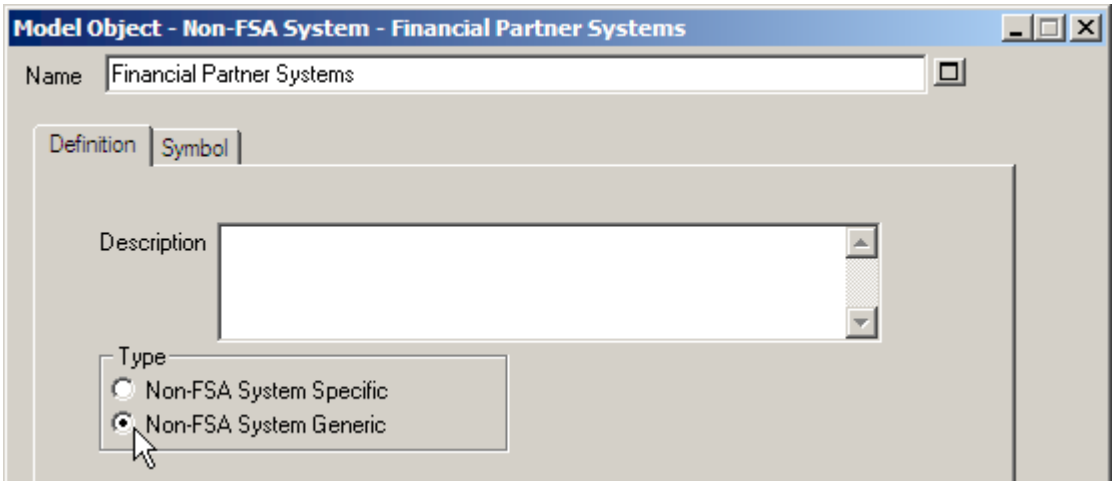


Figure 17 Modifying the "stereotype" of a symbol

- Also relate the Non-FSA System to the **Logical Node** named **Financial Partner** then click OK.
- *Use the Choices… button to display a list of available Logical Nodes.*
- *As this is a Non-FSA System the list will only display Logical Nodes that have their Type property set to "External".*

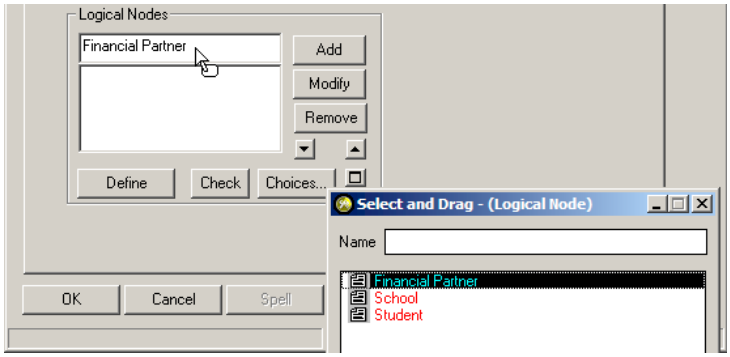


Figure 18 Choices list of Logical Nodes

- Click OK, then right-click on the symbol to access its floating menu. Select **Display According to Type**.

The symbol named Financial Partner Systems is now displayed according to its "stereotype".

- Right-click on the symbol to access its floating menu. Select **Display as Non-FSA System**.

This is now the default display.

- Access the floating menu again; select **Display According to Type**.

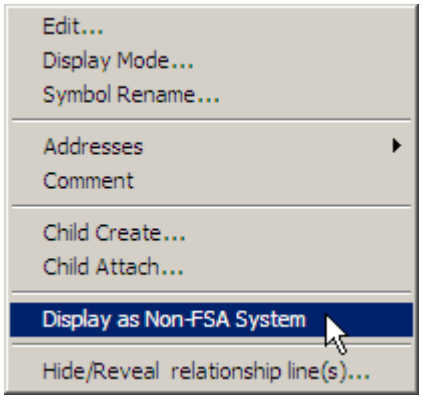


Figure 19 Symbol Display Toggle

- Next place three **Stakeholder** symbols on to the diagram.
- This tme, select the Type of Stakeholder directly from the drop down list on the Draw toolbar,
- Name the symbols, **Financial Partner**s, **Schools** and **Students**.

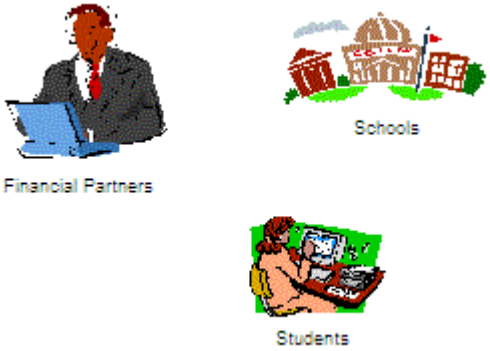


Figure 20 Stakeholder Symbols

- Draw a **Conceptual Association** line, named **Financial Partner Access**, between the Stakeholder symbol, Financial Partners and the Non-FSA System, Financial Partner Systems.

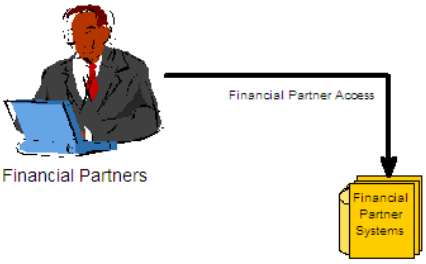
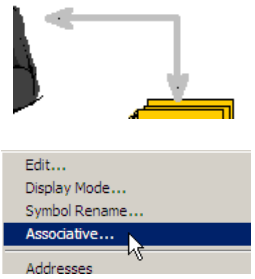


Figure 21 Drawn Line Symbol

- Modify the **Pen Color** of the line to be Light Grey.
- Right-click the line symbol to access its **Associative Properties**. Ensure both Checkboxes are checked (✓)so that an arrow head displays at both ends of the line.



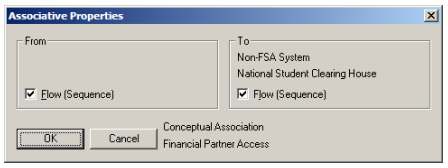


Figure 22 Symbol Color and Associative Properties

Complete the rest of the diagram as shown on the following page.

Diagram Notes:

- The Non-FSA System symbols **ELM Net & Meteor** and **School Systems** should both be of Type **Non-FSA System Generic**. The Non-FSA System Symbol **National Student Clearing House** should be of Type **Non-FSA System Specific**.
- The Conceptual Association lines to Financial Partners are all **Light Grey** in color.
- The Conceptual Association Lines to Students are all **Orange** in color.
- The Conceptual Association Lines to Schools are all **Brown** in color.
- The Conceptual Association Lines between Non-FSA Systems and FSA Systems are all **Blue** in color.
- The Conceptual Association Line between FSA Workforce and Person to Person is **Light Green** in color.
- The box labeled FSA Customer Interfaces is drawn with the generic **Rectangle** symbol found on all diagrams.

When you have completed the diagram, right-click the **Business System** named **ED Express** to view the Properties that allow other architectural relationships to be instantiated.

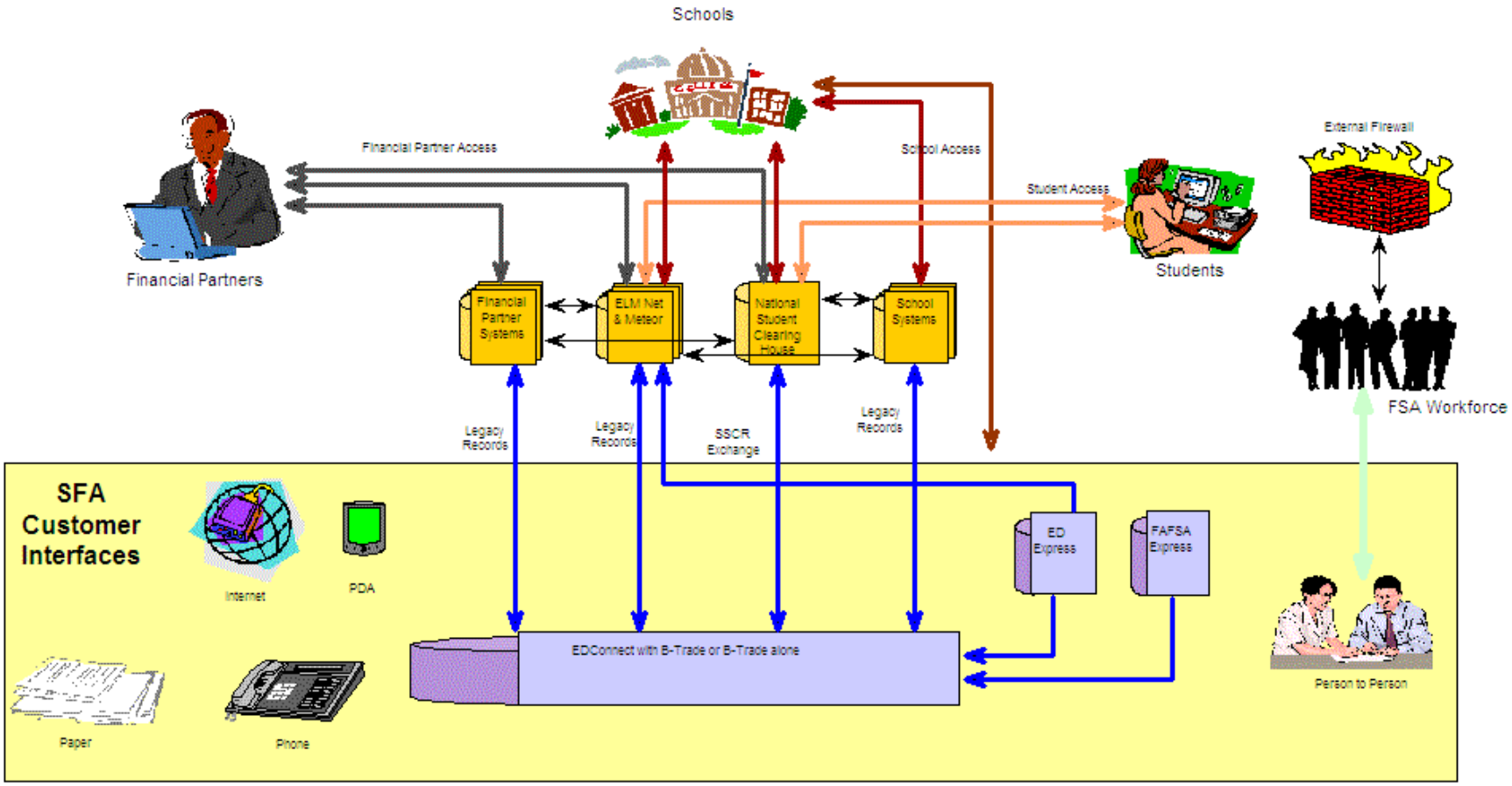


Figure 23 Example Operational Concept Diagram

Business Function Hierarchy Diagram

Overview

The Business Function Hierarchy Diagram continues the decomposition of Missions, Goals and Objectives into Core Business Functions, and Key Business Activities. The Core Business Function definition contains relationships to Drivers, Logical Nodes (of type Location) and Security issues. So we can know **why** a function is performed, **where** it is performed and the **risks** involved in performing the function.

Toolbars and Icons

☞ *The Key Business Activity symbol is **always** attached beneath the Core Business Function symbol, in hierarchical fashion.*

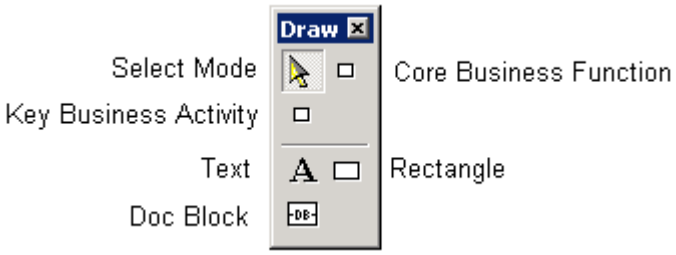


Figure 24 Business Function Hierarchy Toolbar

Business Function Hierarchy Example

✋ Create a Business Function Hierarchy Diagram and name it **Student & Partner Eligibility**.

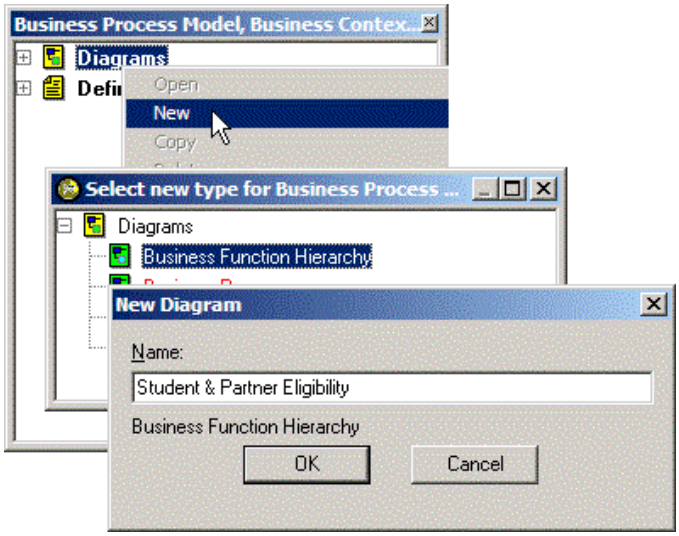


Figure 25 Diagram Creation Sequence

✋ Create a Core Business Function by setting the mode on the draw toolbar for the symbol **Core Business Function** and drop it on the diagram. Name the symbol, **Monitoring and Oversight**.

- Create a second Core Business Function named **Eligibility Processing**.
- Connect the two symbols as shown in **Figure 26**.

☞ *This is common behavior for all hierarchical diagrams.*

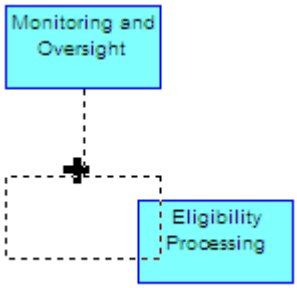


Figure 26 Simple Connections on Hierarchical Diagrams

The Core Business Function defines the scope of the enterprise at the highest level independent of the structure.

- Create 3 more Core Business Function symbols and drop each one on the diagram. Name the symbols **Performance Monitoring**, **Taking Actions** and **Output Processing**.
- Connect each Core Business Function symbol **beneath** the top-level symbol, **Monitoring and Oversight**, as you did before.
- Complete the diagram with the **Key Business Activities** that decompose each 2nd level Core Business Function. Refer to **Figure 27** below for the names of the Key Business Activities.

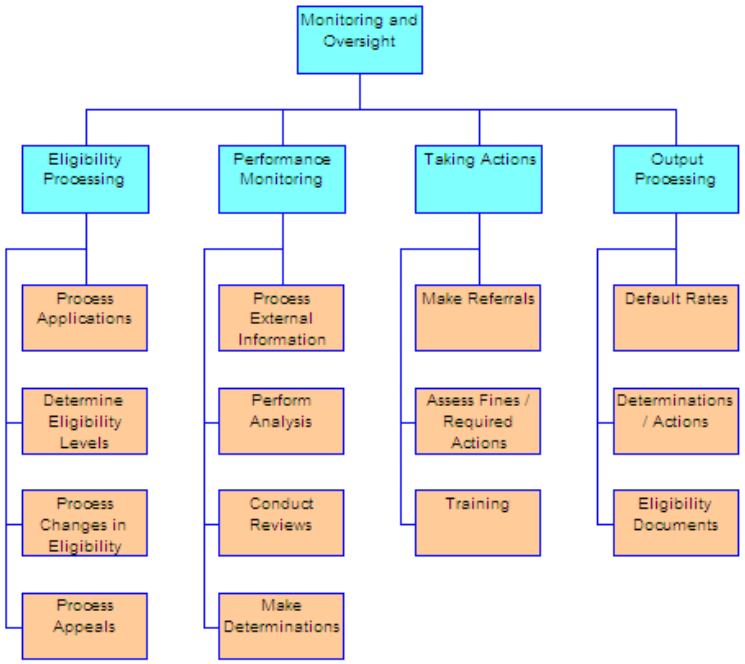


Figure 27 Example Business Function Hierarchy diagram

When you initially attached the child symbols they will be laid out in Horizontal fashion. Lets take a look at Hierarchical diagram arrangements.

☞ ***Make a note that Child Business Process Diagrams may be created from each of the Key Business Activity Symbols on this diagram. This will be revisited later in this chapter.***

Sub-Trees on hierarchical diagrams can be arranged several different ways in System Architect.

To access these options select the Core Business Function symbol, **Eligibility Processing**, right click the symbol, and view the different ways a user can choose to display the diagram hierarchy.

- Arrange the children of all 2nd level Core Business Function symbols to display **Vertically**.

☞ *Note the Parent / Child navigation, and Hide Sub-tree, options that are also available.*

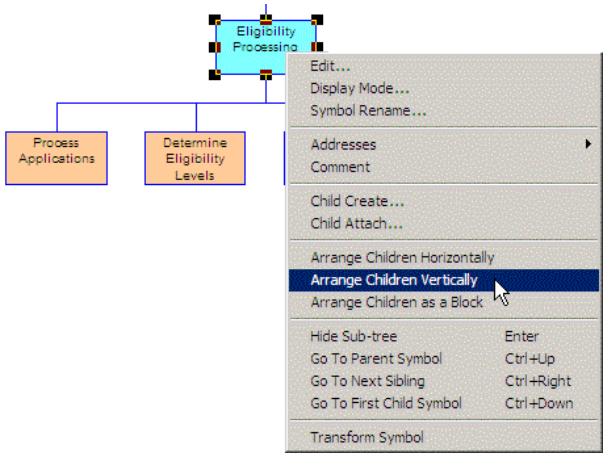


Figure 28 Arranging Hierarchical Diagrams

As well as the definitions we have seen, diagrams may also have properties that provide some description of the diagram in a holistic sense. Each Business Function Hierarchy diagram may be associated with a single **Line of Business** definition.

Each Line of Business definition represents a business event that is happening at a point in time of significance to the enterprise.

To associate the current Business Function Hierarchy diagram with a Line of Business, right-click in diagram white-space and select **Diagram Properties…**

- Access the Diagram Properties for the current diagram.

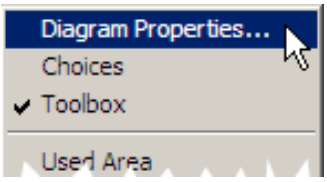


Figure 29 Diagram Floating Menu

- Type **Eligibility Applications** into the **Line of Business** property and click **Define** to instantiate the definition.
- Click **OK** twice to return to the Business Function Hierarchy diagram.

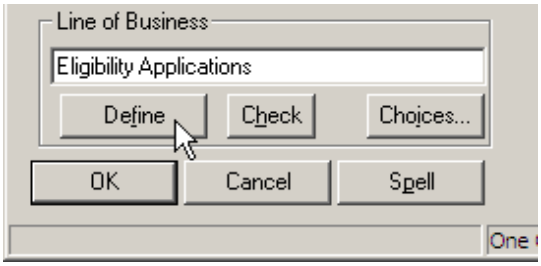


Figure 30 Diagram Property

☞ *Lines of Business are also related to the Data Area definition type via the Lines of Business to Data Area Matrix.*

The Business Process Diagram

Overview

The Business Process Diagram defines the 5-10 steps that are performed in the execution of a Core Business Function and are direct child descendants of a specified Key Business Activity symbol that decomposes from the Core Business Function. Key Business Activities appear on a Business Function Hierarchy Diagram, described in the previous section, and can be thought of as the "umbrella" symbol to an entire Business Process diagram. In other words the Key Business Activity is the holistic representation of a Business Process Diagram in the Functional Hierarchy.

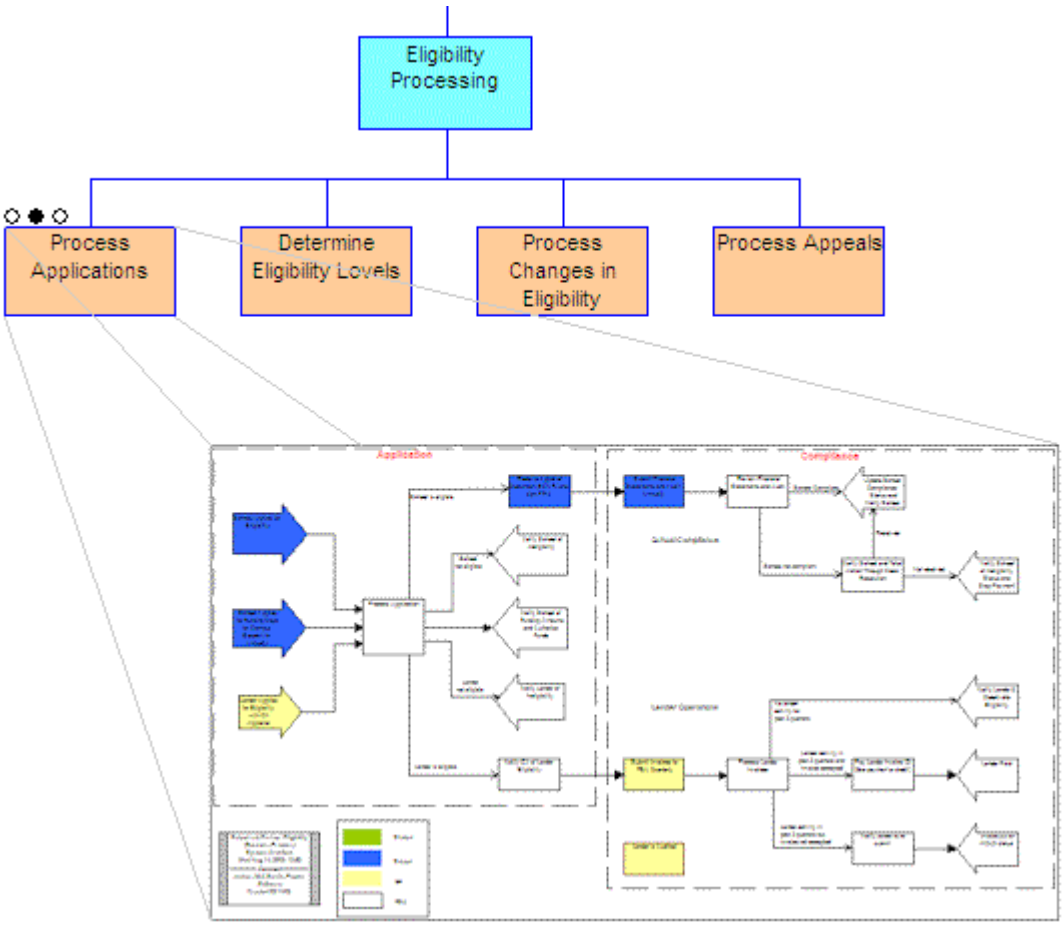


Figure 31 Business Process Diagram seen as child of a Key Business Activity Symbol

☞ *The "Traffic Light" Notation (○●○) on the parent Symbol signifies that the symbol has a child diagram.*

✋ Reopen the Business Function Hierarchy Diagram, **Student & Partner Eligibility**.

✋ Locate the Key Business Activity, **Process Applications**.

Right click the **Process Applications** symbol and choose **Child Create…** from the symbol's floating menu.

*You may also attach any existing diagram to any symbol using **Child Attach…***

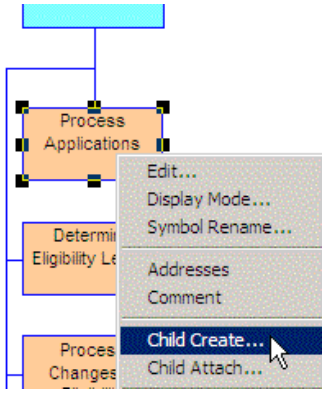


Figure 32 Child Create Option

By default System Architect will suggest that the Child diagram be of the same type as that which the parent symbol belongs to, and that the name of the child diagram will be the same as the parent symbol name.

Ensure you select **Business Process** as the diagram type and enter **Lender Application and Compliance** as the name of the new diagram.

Save the Business Function Hierarchy diagram when prompted to do so.

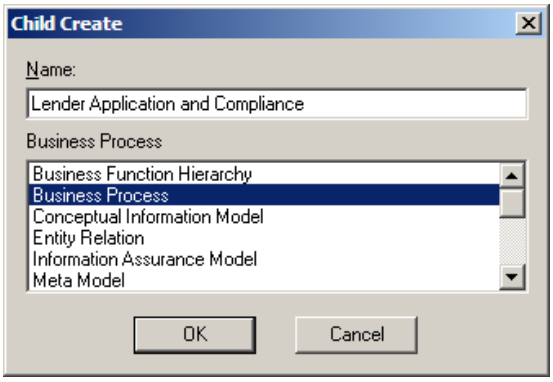


Figure 33 Select Name and Type for Child diagram

Navigating Parent and Child Diagrams

Parent and Child diagrams can be opened in the same way as any other diagram, but can also be opened in the following manner:

1. With the Parent diagram open and the Parent symbol selected, select **Child Open** from the **Edit, Goto Diagram** submenu, or with the Child diagram open, select **Parent** or **Top** from the **Edit, Goto Diagram** submenu.

2. With the Parent diagram open right-click over the Parent symbol and select **Child Open** from its floating menu; or with the Child diagram open right-click in 'white space' and select **Parent** or **Top** from its floating menu.

3. Using the three Parent/Child icons on the Diagram Toolbar:


Child Diagram


Parent Diagram


Top Diagram

A maximum of twelve diagrams can be open at any one time.

The above techniques can also be used to **move** between the open Parent and Child diagrams rather than use the diagram list within the **Window** menu.

Modeling the Business Process Diagram

The Business Process model briefly describes the enterprise processes, identifies the events to which the business must respond and the results produced, and presents a design for new business process flows. The diagram should model both the present process and the future process, with the level of detail varying according to the needs of the project.

Toolbars and Icons

- Take a moment to view the **Diagram Properties** of the Business Process Diagram.

- *Note that you may elect to use Swim Lines on the diagram to designate responsibility for a Business Process, either by Business Role or Business Unit, as shown on the Draw Toolbar in **Figure 34**.*

- *Swim Lanes are set to **None** by Default*

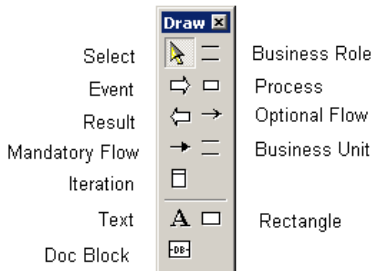


Figure 34 Business Process Draw Toolbar

Business Event Definition

Business Events are occurrences to which the Business Process must respond. Business Event Definitions briefly define and describe these Events. A simple description field is provided.

Business Result Definition

Results are the outcome of a business's response to an Event. Business Result Definitions briefly define and describe these results. A simple description field is provided.

- Create one Event by first setting the mode on the draw toolbar for the symbol **Event**. Drop the symbol onto the Business Process Diagram and name it, **Lender Applies for Eligibility with GA Approval**.

- Additionally, create 4 Results in the same manor as above. Name the Results, **Notify Lender of Ineligibility**, **Notify Lender & Deactivate Eligibility**, **Lender Paid** and **Invoice Put on HOLD Status**.

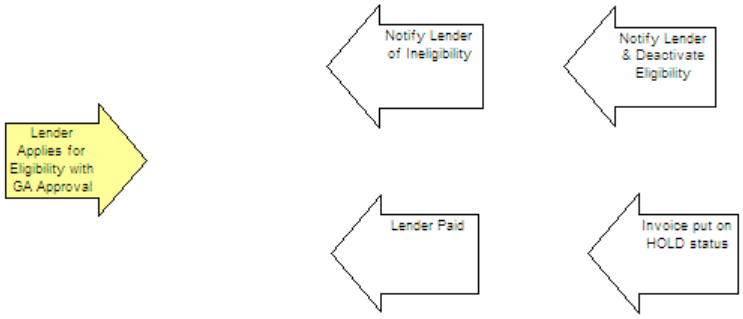


Figure 35 Event and Result Symbols

- Modify the color of the **Event** to be **Yellow**, signifying that responsibility lies with a Lender. Adjust the **size** of the Event if necessary.

- The Results should all be **White** in color, signifying FSA responsibility.

- Create an Elementary Business Process by setting the mode on the draw toolbar for the symbol **Process**. Drop the symbol on the diagram and name it, **Process Application**.

  This EBP should also be **White** in color.

Additional EBPs

- Create the following EBPs and add them to the existing diagram modifying their color as indicated and their size where necessary:

Elementary Business Process	Color
Notify GA of Lender Eligibility	White
Submit Invoices to FSA Quarterly	Yellow
Process Lender Invoices	White
Pay Lender Invoice (Or Zero payment or credit)	White
Notify lender to re-submit	White

Mandatory and Optional Flow Lines

Flow lines on the Business Process diagram allow users to graphically depict mandatory or optional flow of information. The definitions of both line symbols are called Information Exchanges and allow the association of many entities built in the Logical Data Model. These Exchanges also have property sets that keep track of Media, Source and Destination AIS, Event Trigger, Frequency of Transmission, LISI Level, Size, Security Features, Priority, and Interop Issues/Remarks information.

☞ *Think about where we have seen the Information Exchange definition before.*

- Create an Mandatory Flow (Info Exchange) by setting the mode on the tool bar. Draw the line between the Event, Lender Applies for Eligibility with GA Approval, and the EBP, Process Application. Name the Mandatory Flow, **Application Submission**.

☞ *To instantiate the symbol without naming it Delete the suggested default name and hit Enter.*

- Consider ways of automating this behavior in System Architect for all future Mandatory Flow lines in this diagram.

- Access the definition dialog for the Mandatory Flow, **Application Submission**.

☞ *Note that the definition is called an **Information Exchange**.*

The **Information Content** property holds a list of **Data Class** definitions, allowing us to explicitly state the type of information passing across the flow.

- Add a Data Class named **APPLICATION** and update the **Media** property with the text, **Paper or Web based Form**.

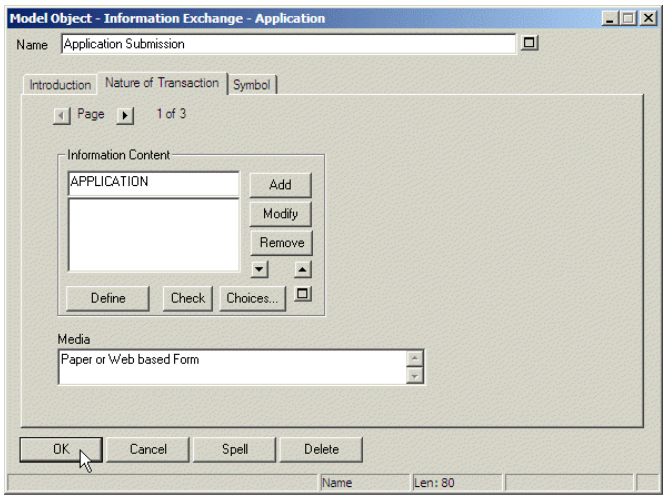


Figure 36 Information Exchange

- Click the **Define** button for the Data Class named **APPLICATION**.
- Navigate to the **Business Relationships** tab and click **Choices…** on the **Business Functions Property**.
- **Drag and Drop** the Core Business Function, **Eligibility Processing** into the property.
- Click **OK** to all definitions and return to the Business Process diagram.

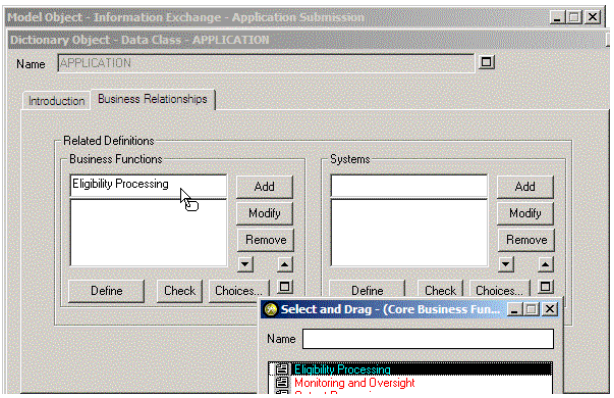


Figure 37 Drag and Drop Core Business Function

The Information Content (Data Class) of the Information Exchange definition is displayable in the Mandatory Flow line.

- To display the list of Data Class definitions, right-click on the Mandatory Flow symbol and ensure **Sends Info** is checked. Also check **Auto Resize**.
- Return to the diagram to view the Data Class named APPLICATION displayed on the flow.

☞ *These setting may apply to selected symbols, or to all symbols of that type on the diagram.*

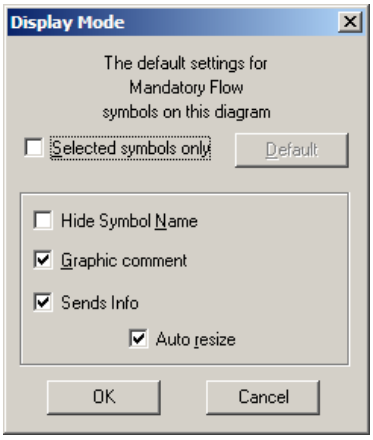


Figure 38 Display Mode

- Add an **Optional Flow** line symbol named, **Lender not eligible**, from the EBP, **Process Applications** to the Result, **Notify Lender of Ineligibility**.

☞ *Optional Flow symbols are also defined by the Information Exchange definition.*

- Complete the diagram with additional **Mandatory** and **Optional** Flow symbols.

The Optional Flows are named:

- Lender is eligible
- No lender activity for past 2 quarters
- Lender activity in past 2 quarters but invoice not accepted

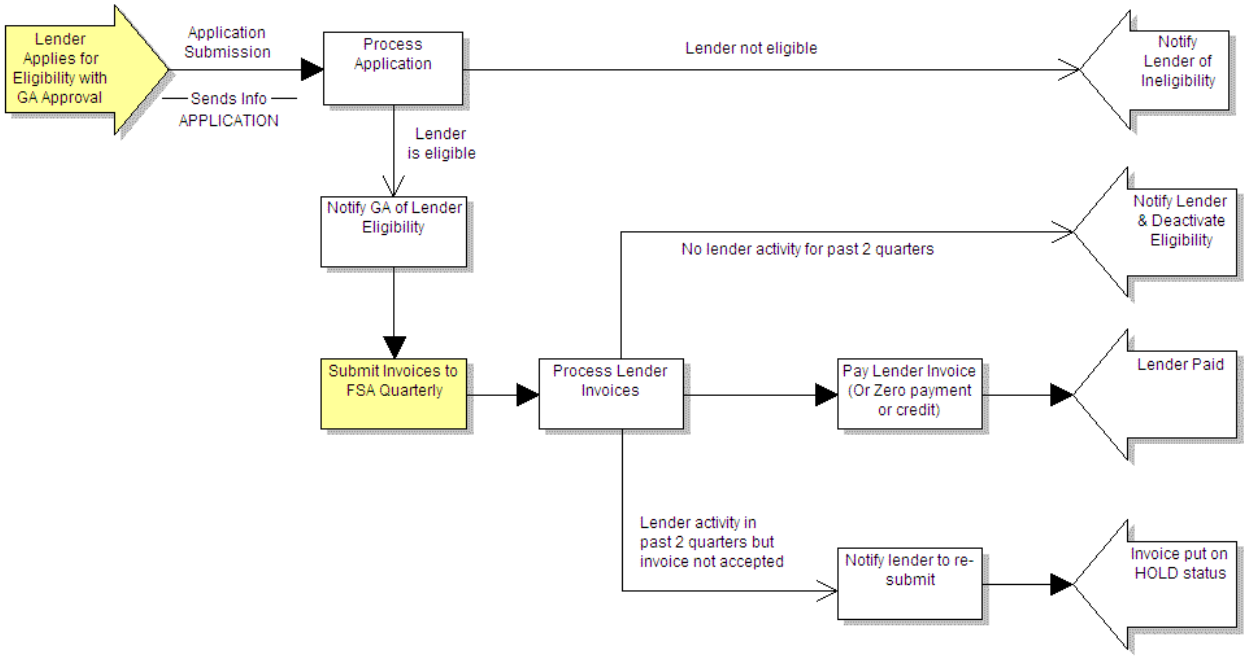


Figure 39 Completed Business Process Diagram

- Save the diagram then practice navigating to and from the Parent Business Function Hierarchy diagram.

- Take a moment to explore some of the definition level relationships we have created so far.

Matrix Support for Business Function Modeling

The SA Matrix Editor

System Architect provides a suite of Matrix Editors that can be used to enter information on the models before a single diagram is drawn. From an analysis standpoint, entering data through matrices provides the user with a wide view of the problem domain and the information that the models can/will contain, and the intersections of dependant definitions.

Matrix Editors provide a different entry point for entering information into the project encyclopedia, in addition to the normal techniques of using diagrams and definitions. Information entered into the Matrix Editors is automatically entered into symbol definitions; changes to information in either place are synchronized – the Matrix Editors simply provide another view of the information.

The Matrix Editors are synchronized with definitions in System Architect. This means that changes made to definitions in the matrix are automatically visible via the framework browsers and vice versa. Such changes may be the addition of new definitions or the modification of existing definitions.

Each matrix may be saved as an HTML, MS Excel, MS Word or CSV file.

Three matrices are provided to assist in the identification and instantiation of cross-architectural definition relationships.

Click once on each cell at rows 1 and 2 in the Business Function Column of the Framework to display the available matrices.

☞ *We will be taking a look at **the Lines of Business to Data Area** Matrix in the next chapter.*

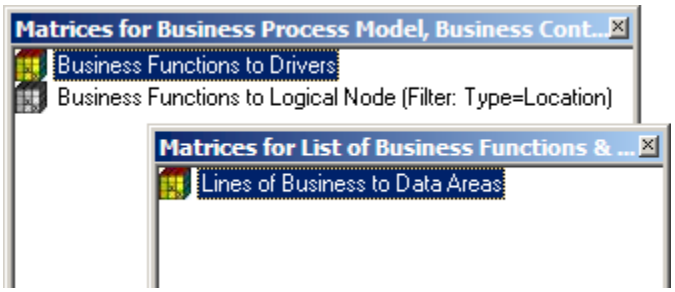


Figure 40 Business Function Matrices

✋ Double click the matrix named **Business Functions to Logical Node (Filter: Type=Location)**.

☞ *It is important when launching this Framework **for the first time** that you set the filter on the Logical Node definition, as specified. This is because, in addition to Location, Logical Nodes may also be of Type **Organization**, **External** or **Other**.*

✋ Explore some of the filter **Comparisons** that are available then specify the Filter as shown on the next page.

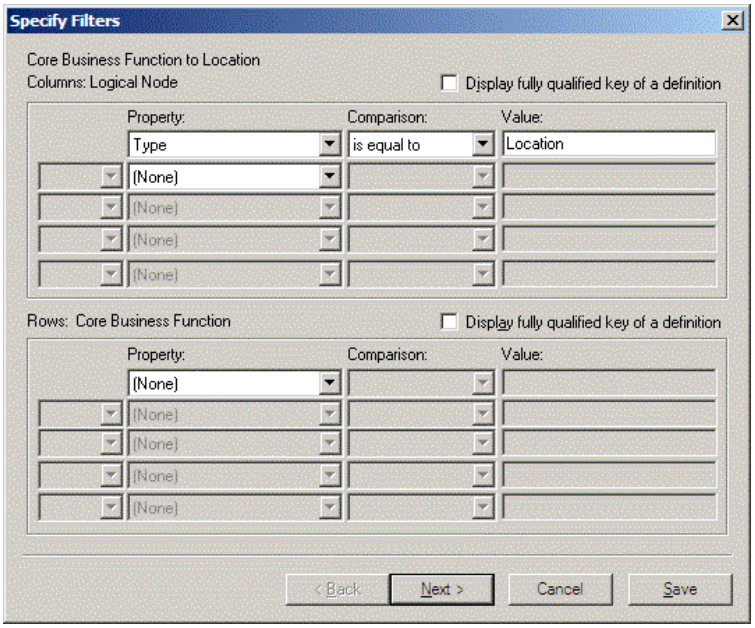


Figure 41 Specify Matrix Filters

Click the **Save** button to save this filter specification.

Next time you open this matrix the filters will automatically be set.

Click Next to bring up the pick list of available definitions.

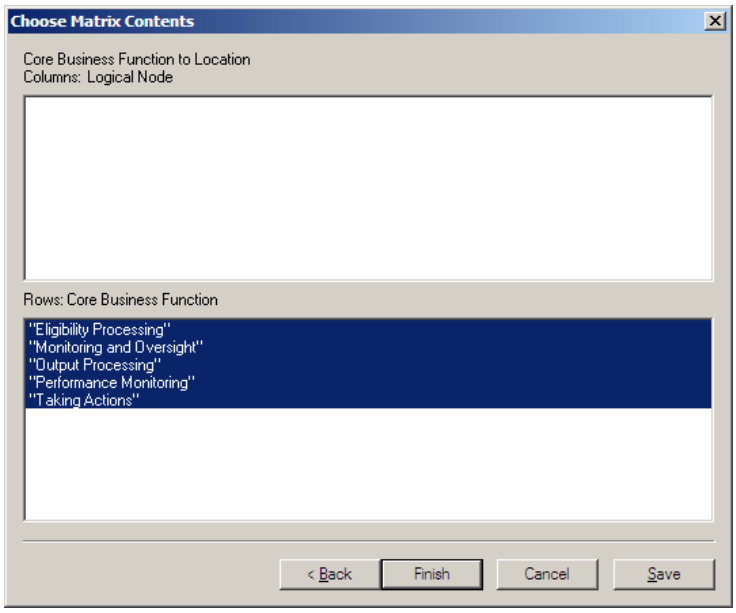


Figure 42 Definition Pick Lists

We have not defined any Logical Node definitions of type Location yet!!

To add a new definition instance to either a Row or Column right-click in the grey row or column area that displays the names of definitions.

In the case of a new row select Add Row Definition or click the button in the toolbar.

To add a new column select **Add Column Definition**, as shown, or click the button in the toolbar.

The floating popup menu also gives the user the opportunity to remove or modify a row or column definition. When Modify Column (or Row) Definition is selected the definition window will open allowing the user to edit to its properties.

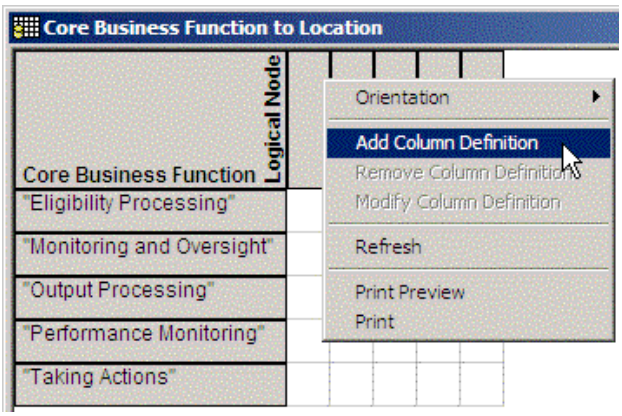


Figure 43 Add Column Definition

To relate a column definition to a row definition you may simply click in the intersecting cell of the matrix.

- Create four Logical Node definitions in the matrix named **Atlanta GA**, **Washington DC**, **Chicago IL** and **San Francisco CA**. Ensure that as you create the definitions their **Type** property is set to **Location**.
- Also add a new **Core Business Function** named **Customer Service & Support**.
- Relate the definitions as shown.

Core Business Function to Location

Core Business Function / Logical Node	"Atlanta GA"	"Washington DC"	"Chicago IL"	"San Francisco CA"
"Eligibility Processing"		X		
"Monitoring and Oversight"		X		
"Output Processing"		X		
"Performance Monitoring"		X		
"Taking Actions"		X		
"Customer Service & Support"	X	X	X	X

Figure 44 Related Definitions

- Close the matrix editor and return to the FSA Framework for the next Chapter.

